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OF THE
UNITED STATES.

READ AT THE MEETING OF THE BRITISH MEDICAL
ASSOCIATION, MONTREAL, CA.,
SEPTEMBER 1-4, 1897.

BY WALTER WYMAN, M. D.,
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Mr. Chairman and Gentleman:—In this discussion I do not propose to comment upon the Quarantine Systems of other countries, nor to make comparisons between them and the system adopted by the United States Government. I propose rather, in the plainest terms possible, and as briefly as possible, to describe the Quarantine System of the United States, to show the conditions which render the system necessary and to explain, so far as time will permit, the rationale of the regulations.

THE DEVELOPMENT OF NATIONAL QUARANTINE.

Until 1893 there was, properly speaking, no National System of Quarantine. The Colonies had their own Quarantine regulations before the formation of the Union, and from that event to 1893 quarantine was left to the care of the State Governments, and by the latter to County Governments or to Municipalities, as the case might be. There was, indeed, National Legislation, but all the Acts of Congress up to 1893, relating to quarantine, specifically provided that the said National measures were in aid of the State and local authorities. Whatever opinions may have been held by members of the National Legislature, quarantine was permitted to be exercised by the States as a police function, and even in the present law, which gives National supremacy, it is provided that assistance shall be given the States or Municipalities by the Government authorities, the supremacy of the latter being asserted only when the State or local authorities fail or refuse to enforce the uniform National regulations.

As a result of the old system, prior to 1893, each State had its own quarantine requirements. Different cities in the same States had different requirements. One city, in order to divert trade from its neighboring rival, would be less exacting than the latter in the inspection and treatment of infected vessels. Some cities found quarantine to be a means of considerable revenue, laying heavy charges for unnecessary inspection and perfunctory disinfection of vessels. The position of Quarantine Officer became extremely lucrative, and one of the principal offices to be used as a reward for political service, and as a source from which could be derived contributions for partisan purposes. No wonder, then, that this system was faulty, a burden upon commerce, and did not protect. But while Congress had allowed, as it were, by sufferance, the State and Municipal supervision of quarantine, it never by any act abandoned or disclaimed its right to maintain quarantine under the clause of the Constitution which gives it the right to regulate commerce, and in 1893 it passed an act entitled "An Act granting additional Quarantine Powers and imposing additional duties upon the Marine Hospital Service," empowering the Secretary of the Treasury to promulgate uniform quarantine regulations for the ports of the United States, to be enforced by the State or Municipal authorities, if they will undertake to enforce them; but if they refuse or fail, directing the President to detail or appoint officers for this purpose. The law further provides that the Surgeon-General of the Marine Hospital Service, under the directions of the Secretary of the Treasury, shall perform all the duties in respect to quarantine, and to quarantine regulations, which are provided for by the Act.

In accordance with this law, regulations have been duly promulgated, and the States and Municipalities have, with unanimity, agreed to and, with some exceptions, have enforced them. To ensure their being enforced, a regular inspection is made yearly by the Marine Hospital Service of every quarantine station in the United States, and more frequent inspections when necessary at points which are particularly threatening. At a great many stations, faults in methods or appliances have been discovered, and rectified by the State or local authorities. This is prompted either by an honest desire to meet necessary requirements, or by the penalty of being superseded, under the law, by the National authorities. At a large number of ports, the quarantine has been given over voluntarily to the National Government—which exacts

no fees—and at other ports the National Government has assumed charge by virtue of the law, and because of non-compliance with the regulations.

Besides the power of the National Government of taking formal possession of Quarantine, the Treasury Department has another resource in that all vessels from foreign ports before discharge of cargo or passengers, must have been legally entered by the Collector of Customs. As the Collectors are officers of the Treasury Department, they may refuse entry, unless the quarantine, as well as other regulations of the Treasury Department, have been complied with.

It should be added, and it may be confessed to be a defect in the National System, that the General Government has at present no right to prevent State or local authorities prescribing and enforcing quarantine measures over and above those required by the Treasury Regulations. The latter are minimum requirements. The States may add to them, and while in the interest of their own commerce, and as a result of an enlightened public opinion, absurd practices and those for revenue only have become far less frequent than formerly; nevertheless, such practices are to a limited extent in certain localities still exercised.

While here and there local authorities, prompted by pecuniary motives and feelings of States' rights, are protesting against the surveillance of the Federal Government, a strong sentiment for exclusive national control is developing, even in the States, which have been heretofore most thoroughly identified with the States' rights doctrine, and also in the interior States, whose borders may not touch the sea, but may be reached by infection brought across it.

With the foregoing explanation, I come now to the system established by Congress, and which, notwithstanding the slight variations above mentioned, is the one dominant uniform system of the United States to-day. This system begins with

SHIP SANITATION AT FOREIGN PORTS.

The law requires that every vessel leaving a foreign port for the United States shall have a bill of health, in duplicate, signed by the United States Consul. This bill of health contains a number of items regarding the vessel, crew, passengers and cargo, a statement of the prevailing diseases at the port during the previous two weeks, and of conditions affecting the public health, and a

certificate to be signed by the Consul that the vessel has complied with the regulations made under the Act of Feb. 15th, 1893. These regulations are such as to ensure, so far as possible, that the vessel is not a carrier of epidemic disease. If the Consul cannot sign this bill of health, he is not expected to give it, and without it, if the vessel attempts to enter at a port of the United States, she is subject to a fine of five thousand dollars.

It should be noted that there is no such thing as a foul bill of health. The vessel must be safe, in the opinion of the Consul, before leaving the port.

Now, to assist the Consul in times requiring unusual precautions, the President is authorized to detail medical officers to serve as the Consulates; and in 1893, when cholera was particularly threatening, twelve medical officers of the Marine Hospital Service were thus detailed in foreign ports, and sixteen sanitary inspectors appointed to assist them. The value of their services is illustrated by the record at Naples. During the season of 1893, after cholera had been declared epidemic in Naples, three vessels left for the United States—the *Masilia*, *Weser* and *Cashmere*—and all were made to conform to the regulations. They all arrived at the port of New York, with no cholera en route, or at time of arrival. During the same period four vessels, with the same class of passengers, and their places of origin similar, in many cases identical, the water and food supply being the same as on the vessels for the United States, left for South America, and all were turned back by the South American authorities and returned to Naples. One, the *Vincenzia Floria*, had about 50 deaths; the *Andrea Gloria*, 90 on the way out—total not ascertained. Another, 84 deaths, and the fourth, 230 deaths from cholera.

The Marine Hospital Service officers were recalled in December, 1893, but the service still maintains sanitary inspectors to assist the Consuls at a number of foreign ports, as at Havana and Santiago de Cuba, Rio de Janeiro and Yokohama.

A feature of great value in connection with the regulations to be observed in foreign ports is, that they go into effect immediately, as soon as the Consul learns of the presence of epidemic disease. There is never any formal declaration of the infection of a foreign port other than the information contained on the Consular Bill of Health, or information published weekly in the Public Health Reports issued by the Marine Hospital Bureau. In 1895, when cholera became epidemic in Japan, the United States Consul

immediately put into operation the regulations to be observed on vessels bound for the United States, and no cholera was brought on them.

QUARANTINE AT DOMESTIC PORTS.

Now, in speaking of the utility of inspection, disinfection and isolation stations at domestic ports, it is necessary to remark upon certain peculiar conditions attaching to the United States. First, the great number of the ports of entry, and the great length of coast line, measuring, exclusive of Alaska, 5,450 statute miles, not counting the intricacies of the shore line. Then the great population, numbering in 1890 about 63,000,000, while that of the German Empire, without its dependencies, was 49,000,000; France, 38,000,000; Great Britain and Ireland, 37,000,000; Italy, 30,000,000, and Spain, 17,000,000. The areas covered by these populations are as follows: United States, 2,970,000 square miles; German Empire, 200,000; France, 204,000; Great Britain and Ireland, 121,000; Italy, 114,000; Spain, 194,000.

Again, special conditions exist in connection with the great crowds of immigrants that daily land upon our shores. In ten years (1882-1891) more than five millions of them arrived, and in one year alone (1891) more than half a million were received.

These immigrants are from all countries, from over-populated districts; they are mainly of the poor and ignorant class, and through their baggage, as well as themselves, subject the United States to the importation of infectious disease to a degree far in excess of the exposure of any of the nations just mentioned.

Other conditions affecting the quarantine policy of the United States, are found in the great variations of climate and in the character of the commerce on different portions of our coast, by reason of which diseases much dreaded in our section give but little concern in another. There are, therefore, three geographical sections. First, the Atlantic Coast, north of the Southern Boundary of Maryland. Here arrive most of the immigrants, and our chief concern is with regard to cholera, smallpox and typhoid fever, while yellow fever excites but little apprehension. Second, the Atlantic Coast, south of the Southern Boundary of Maryland and the Gulf Coast. Here very few immigrants arrive, but on account of proximity to the Spanish Main, with its yellow fever infected seaports and because climatic conditions favor the propagation of yellow fever if introduced, that disease is the chief con-

cern. Third, the Pacific Coast. Here there is some immigration from China, and guard must be kept against yellow fever from South America—smallpox, cholera and the plague from the Orient.

INSPECTION, DISINFECTION AND ISOLATION STATIONS.

The United States has each of the three kinds of stations mentioned in the subject of discussion. There are stations for inspection only. At these there is an examination of the bill of health, a medical inspection on the vessel, and the granting of a certificate of discharge without which the vessel cannot be legally entered at the Custom House. If the vessel is infected, it may be remanded by the Secretary of the Treasury to the nearest fully equipped station—National or State—for treatment.

At disinfection and isolation stations the quarantine procedures are based upon the life history of the bacillus or germ of the several epidemic diseases, its period of incubation in the human being and its susceptibility to germicidal agents. When, as with regard to yellow fever, our knowledge is inexact, the regulations are based upon observation and experience. At these stations a leading principle is to clear the ship of infection, make it safe and allow it to proceed as soon as possible.

SMALLPOX.—If a vessel arrives with smallpox, the patient is removed at once to hospital, all on board are vaccinated or must show evidence of recent vaccination, or of having had smallpox. Those known to have been exposed are held under observation; others, after being vaccinated, are allowed to proceed. In case the vessel brings immigrants, it is not thought necessary to detain all of them; information is telegraphed to their points of destination in order that they may be under observation by the local health authorities. As soon as the infected portions of the vessel have been disinfected and the sick and suspects removed, and the Quarantine Officer has been satisfied as to vaccination, the vessel is no longer detained.

CHOLERA.—If a vessel arrives with cholera on board, all the passengers and all of the crew, save those necessary to care for her, must be removed—the sick to the hospital and those specially suspected isolated in barracks. The remainder are segregated in small groups, with no communication allowed between them. Those believed to be especially capable of conveying infection must not enter the barracks until they are bathed and furnished with sterile

clothing, and if cholera has occurred in the steerage all occupants thereof must be bathed and their clothing disinfected. All baggage, including hand baggage and effects, accompanying steerage passengers, must be disinfected. The living apartments, and such other portions of the vessel as are liable to be infected are then disinfected. The water supply is changed at once, and the casks or tanks containing the same thoroughly cleaned, and, if need be, disinfected. The passengers are detained on account of cholera until five days have elapsed since the last exposure to infection, and a final disinfection of their effects required before discharge.

YELLOW FEVER.—With regard to yellow fever, the regulations vary according to the season of the year. From the 1st of May to the 1st of November vessels arriving at ports on the Atlantic and Gulf Coast, south of the Southern Boundary of Maryland, if from yellow fever infected ports, undergo the same process as though they were actually infected. Those arriving at northern ports are not thus treated. Following are the regulations for the treatment of vessels infected or suspected of being infected with yellow fever:

Some exception is made to the above with regard to iron steam vessels bringing passengers, but stringent and specific requirements are made of these latter, such as immunity of the crew to yellow fever, the mooring of the vessel in the open harbor at the foreign port, non-communication of the crew with the shore and immunity to yellow fever of the passengers—no bedding or household effects being allowed shipment, and all baggage to be disinfected, unless checked through under special regulations to northern ports.

DISINFECTING AGENTS.

The disinfecting agents used at quarantine stations are steam, sulphur dioxide, bichloride of mercury in solution and formaldehyde gas, the use of the last having been recently authorized by Department Circular. Time will not permit a full description of the appliances and processes connected with each agent. It must suffice to state in a general way that steam is ordinarily used for the disinfection of clothing and dunnage, in an iron and casketed chamber, provided with a vacuum apparatus. There are thirty-five of these steam chambers in operation at the several quarantines in the United States. Occasionally steam has been used also for the disinfection of the living apartments of vessels above the water line.

Sulphur dioxide is used for the disinfection of the holds of vessels, and of special apartments, and is generated from a specially devised furnace provided with a fan-blower for forcing the fumes of sulphur into the vessel's hold. The regulations require that the sulphur dioxide shall be of a 10 per cent. per volume strength to ensure penetration to all parts of the vessel, especially those parts which are constructed of wood, for it requires a 6 per cent. per volume strength to penetrate wood containing 10 per cent. moisture, and the additional 4 per cent. is required to ensure safety.

Three per cent. volume strength is sufficient for most of the non spore bearing micro-organisms when they can be reached. The action of the gas on infected fabrics when in less than 6 per cent. is extremely variable. A strong solution of the gas is always required when such articles are to be disinfected. Mattresses, pillows and upholstered furniture cannot always be disinfected by the gas even when large percentages of the gas are used.

The bichloride mercury in solution is used for the dipping of stone ballast, and the washing of the fore-castle or cabin, and occasionally the washing down of the hold of the vessel.

Formaldehyd gas may be used instead of steam, as it is not injurious to fabrics. It is believed that it will in time prove to be a cheaper process, while its germicidal action is undoubted. The apparatus necessary for its generation and subsequent neutralization can be readily attached to the steam chambers now in use.

There are in the United States about 120 inspection stations; 26 of these are provided with disinfecting appliances, steam chambers, sulphur furnaces, and tanks for bichloride of mercury solution, and of the 26, 8 of the stations are provided with means of detention of persons held under observation.

ISOLATION STATIONS.

Isolation stations are chiefly in the north, at ports where immigrants arrive. A fair example may be cited in the United States Quarantine Station at the Delaware Breakwater, where barracks have been erected to accommodate nearly 1,000 immigrants while being held under observation.

The utility of these stations has been proven by success in the prevention of the introduction of epidemic diseases in the past few years.

In 1892 cholera gained admission into New York City, but not in the interior, but this was before the passage of the present quar-

antine law under which the present quarantine regulations have been promulgated.

In 1893 several vessels arrived at the New York quarantine, infected with cholera, but cholera did not gain admission if we except two isolated cases in Jersey City, from which there was no extension of the disease, and concerning the origin of which no satisfactory explanation has yet been made. The widespread prevalence of cholera in Europe in 1892-3 will be remembered, and history shows that an European invasion was formerly invariably followed by an invasion of the United States. In 1893, however, its invasion was prevented.

During the present century, up to 1894, there were but seven years in which yellow fever did not visit the United States. It is now four years since it has gained admission, the last time being at Brunswick, in 1893, before the present regulations were in operation. The last great epidemic was in 1878, and in that year yellow fever invaded 132 towns of the United States, caused a mortality of 15,934 persons, and the pecuniary loss to the country has been stated as \$100,000,000 in gold. The disease is constantly threatening the United States from Cuba and other ports in the Spanish Main, and to my mind there can be no question that to the quarantine restraints are we indebted for immunity since 1893.

The utility of quarantine is also illustrated by the epidemic inflictions upon those countries which have no quarantine, or whose quarantine is but a name, as that of the Island of Cuba, where smallpox is readily introduced from Spain and the Isthmus of Panama, where yellow fever has been introduced during the present summer through want of quarantine precautions.

Again, the disaster and death caused by the absence of proper quarantine facilities is strikingly illustrated in the history of those ships previously mentioned which went from Naples to South America, where because of a want of proper quarantine protection the authorities saw fit to turn them back—a harsh and cruel measure, each ship a floating charnel house, returning across the sea to its port of departure, Naples, leaving in its wake a string of dead bodies, the victims of cholera infection. Humanity, therefore, demands quarantine. I am well aware of the prejudice against quarantine caused by its absurdities and the preference that has been expressed for the sanitation of cities, so that even if epidemic disease is introduced it will not spread. But modern scientific quarantine is nothing more than sanitation of ships and the neces-

sary precautions to prevent the spread of disease; and no protests are more vigorous than those of quarantine officers against the continued infection of ports and places which, with a due regard to healthful conditions, and some expenditure of money for sanitary engineering could be deprived of their character as foci of infectious diseases.

